



Concept Understanding Skill of 8th Grade Junior High School Students in Missouri Mathematics Project Learning Based Curiosity With Scaffolding

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Abstrack

This study aims to describe the concept understanding of 8th grade students at various levels of student curiosity in learning the Missouri Mathematics Project with the Scaffolding approach based on diagnostic assessments. The research method used is a concurrent embedded type mix method. The population was taken from 8th grade students at SMP N 5 Pati. Subjects were chosen based on each category of level of curiosity. This category consists of high, medium and low using purposive sampling to determine the sample. The findings show that the understanding of concepts from various categories of curiosity has diverse understanding of concepts. Each category of curiosity can apply the concept or algorithm to solve the problem properly. So curiosity does not absolutely influence the ability to understand concepts.

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INTRODUCTION

Efforts to improve the quality of mathematics learning play an important role in the process of improving the quality of human resources. According to Djazuli (in Herman, 2007) states that efforts to improve the quality of learning mathematics becomes important given several studies that explain that the results of learning mathematics in schools have not shown satisfactory results. The low results achieved in the national evaluation of mathematics, shows that the quality of students' understanding of mathematics is still relatively low. Indonesia's mathematics score at TIMSS 2015 got 397 points with a ranking of 45 out of 50 countries. This needs special attention to the learning of mathematics. Understanding the concept does not only memorize the definition of the concept without regard to the relationship between one concept with other concepts. Memorizing the definition of a concept without understanding the relationship between the concepts will assume the concept is independent and not interconnected between new concepts and old concepts. The new concept will have no meaning because of the meaning of the concept of relations with other concepts.

Fauzan (2011) states that the components of concept understanding include: (1) classifying objects according to certain properties, (2) presenting concepts into mathematical representations, (3) using certain procedures or operations, (4) applying concepts or problem solving algorithms.

The learning model that is expected to be used in mathematics learning to improve concept comprehension skills is the Missouri Mathematics Project learning. Good, Grouws, and Ebmeire in (Slavin, 2007: 31) defines the Missouri Mathematics Project (MMP) as a program designed to assist teachers in the effectiveness of using exercises so that students achieve extraordinary improvements. This is in line with Winardi & Dwijanto (2017), the independence of student learning through the Missouri Mathematics Project learning model reaches both categories with a moderate increase and student responses reach good categories. The Missouri Mathematics Project learning model actively involves students while learning. Students are required to be active in this learning because the teacher's position is as a facilitator who assists and assists students. The

Missouri Mathematics Project learning model is designed to facilitate teacher effectiveness in using exercises in the form of project assignments (Swari, Kartono & Walid, 2019). Some experts say that the Missouri Mathematics Project is a cooperative learning model that requires active students in learning and teachers as facilitators to help students find their knowledge. Students are introduced directly to real objects so that they can increase student motivation and mastery of mathematics (Novalia, Makmuri, Sudrajad & Adhiansa, 2018).

Mathematical learning is very influential in the formation of character in students. There are many characters that are expected to appear in a mathematics learning, one of which is the character of curiosity. The character of this sense of knowing is a way of thinking, attitudes and behaviors that reflect curiosity and curiosity about everything that is seen, heard, and studied in more depth (Ministry of National Education, 2010: 10).

Efforts to improve the ability to understand students' concepts need to be given a learning process using an approach in the form of aids that can help to increase the potential of students in understanding the concepts to be learned. One of the assistance that can be given is the Scaffolding approach. According to Fauziah (2015) MMP assisted by scaffolding can significantly influence students' problem solving abilities, while students' mathematical understanding ability has no significant effect. Based on the results of the validation and the results of trials on mathematics learning with master strategies and the application of scaffolding obtained a valid device and the results of the trials obtained effective learning, then the goal of developing the device is achieved (Santosa, Waluya & Sukestiyarno, 2013).

Based on the background of the problem above, the purpose of this study is to analyze the level of curiosity and understanding of the concepts of eighth grade students of SMP N 5 Pati, find out the quality of mathematics learning using the Missouri Mathematics Project learning model with the Scaffolding approach based on a two-level multiple choice diagnostic assessment, and analyze the ability to understand the concepts of students of class VIII SMP N 5 Pati at various levels of student curiosity. The formulation of

the problem in this study are (1) What is the effectiveness of the Missouri Mathematics Project learning model with the Scaffolding approach to achieving students' understanding of concepts with a two-tier multiple choice diagnostic assessment? (2) What is the description of the concept understanding ability of students of class VIII SMP N 5 Pati at various levels of student curiosity in learning the Missouri Mathematics Project with the Scaffolding approach based on a two-tier multiple choice diagnostic assessment? This study aims to (1) Know the effectiveness of mathematics learning using the Missouri Mathematics Project learning model with the Scaffolding approach based on a two-level multiple choice diagnostic assessment? (2) Analyzing the ability of students to understand the concepts of class VIII SMP N 5 Pati at various levels of student curiosity.

METHOD

The method used in this research is the mix method. The combination design used in this study is the type of concurrent embedded. Model combination method or concurrent embedded design (unbalanced mixture) is a research method that combines qualitative and quantitative research methods by mixing the two methods unbalanced (Sugiyono, 2013). The population of this research is students of class VIII SMP N 5 Pati in the academic year of 2017/2018. From VIII classes in SMP N 5 Pati, 2 classes were randomly selected as research samples in accordance with the research design. Quantitative research sample determination techniques based on purposive sampling. From this technique it can be class VIII C as an experimental class and class VIII F as a control class. In qualitative research, the research subject is focused on class VIII C which is a class subjected to Missouri Mathematics Project learning. In this study 9 students were taken as research subjects based on various levels of curiosity, consisting of 3 students with

low curiosity, 3 students with moderate curiosity, and 3 students with high curiosity.

Sources of data in this study were students obtained from a questionnaire of curiosity, a test of the ability to understand concepts, and interviews. A total of 30 students of class VIII C were determined by their curiosity questionnaire scores before learning. During learning observations are made of curiosity of the research subjects. Students' answers on the concept understanding ability test (TKPK) were analyzed and the research subjects were interviewed as triangulation. Quantitative data were tested using normality test, homogeneity test, completeness test, and average difference test. While qualitative data analysis is done by reducing data, presenting data, and drawing conclusions from data that has been collected and verifying these conclusions.

RESULT AND DISCUSSION

Curiosity is the starting point of knowledge possessed by humans. With high curiosity, students will learn more to meet the thirst for knowledge that they want to know. Through their curiosity students will begin to learn and discover (Fauzi, Zainuddin & Atok, 2017). The character of curiosity needs to be instilled so that students have a strong curiosity, strong, and not easily give up (Saironi & Sukestiyarno, 2017).

Missouri Mathematics Project learning in this study is used for the effective use of exercises so that students achieve remarkable improvements. While the results of the classification of students' curiosity are used as a basis for group preparation in analyzing the results of students' understanding of concepts after completing Missouri Mathematics learning Project.

The instrument of learning instrument is said to be valid if it meets the criteria of good or very good. The results of the validation of the research instrument can be seen in the following table.

Table 1. Assessment Result of Learning Devices

Aspect	Mean	Description
Syllabus	4.18	good
Lesson Plan	4.03	good
LKS	4.07	good
Interview Guidelines	4.33	excellent
TKPK	4.03	good
Interview Guidelines	4.3	excellent
Questionnaire	4.33	excellent

Based on the results of the calculation of mastery learning experimental class using the proportion test obtained value of $z_{(0.5-\alpha)} = z_{(0.5-0.05)} = z_{0.45} = 1.64$. $z_{\text{count}} = 2.744$ while $z_{\text{tabel}} = 1.645$. Because $z_{\text{count}} > z_{\text{tabel}}$ then H_0 is rejected, which means the ability of students to understand the concept of learning with MMP learning has reached classical learning completeness.

Based on the calculation results of the different test the average results of the ability to understand the concept of the test obtained t_{count} of 5.880. With $df = 58$ and a 5% significance level, a $t_{\text{table}} = 2.00172$ is obtained. Because $t_{\text{count}} > t_{\text{table}}$, H_0 is rejected. Therefore, it can be concluded that the ability to understand the concept of students in the experimental class is higher than students in the control class. Missouri Mathematics Project learning model is effective on students' concept understanding ability because the learning instruments used are valid, the average value of the concept understanding ability test in Missouri Mathematics Project learning reaches KKM that is 70, the proportion of completeness of students' concept understanding ability in Missouri Mathematics Project learning is more both from the ability to understand the concepts of students in conventional learning.

The ability to understand students' concepts at various levels of curiosity was analyzed starting from various levels of students' curiosity in the low category,

the curiosity of the medium category, and the curiosity of the high category. The subject group of low category students is the subject who has a low curiosity questionnaire score. The acquisition score of curiosity in this subject is between 49 to 56. In the category of low curiosity category obtained by 4 students with an average score of 75 concept comprehension ability tests. Subjects of the moderate category students are subjects who have a curiosity questionnaire score medium or medium. The acquisition score of curiosity in this subject is between 57 to 65. In the category of curiosity category is being obtained by 13 students with an average score of 85.3 understanding concepts. The high group students category subjects were subjects who had high curiosity questionnaire scores. The acquisition score of curiosity in this subject is between 66 to 85. In the category of low curiosity category obtained 13 students with an average score of 85.3 understanding concepts. After obtaining a curiosity category group, each subject was taken 3 subjects to be analyzed based on indicators of concept understanding. Analysis of concept understanding based on the category of curiosity categories is used to find out the description of concept understanding based on the level of curiosity.

Descriptions of understanding concepts based on the level of curiosity are presented in the following table.

Tabel 2. Description of Understanding Student Concepts Based on Level of Curiosity.

Concept Understanding	Curiosity		
	High	Medium	Low
Classifying objects according to certain properties	Enaugh	Enaugh	Enaugh
	Enaugh	Enaugh	Less
	Enaugh	Enaugh	Less
Presenting concepts to the form of mathematical representation	Enaugh	Enaugh	Less
	Enaugh	Enaugh	Enaugh
	Less	Enaugh	Enaugh
Use certain procedures or operations	Well	Enaugh	Well
	Well	Enaugh	Enaugh
	Enaugh	Enaugh	Enaugh
Apply a concept or solving algorithm masalah	Well	Well	Well
	Well	Well	Well
	Well	Well	Well

In the description table the concept of understanding based on the level of curiosity obtained by students who have the curiosity of each category has a diverse ability to understand concepts. In the category of high and medium curiosity each has mastered three indicators. Whereas the low curiosity category group only controlled two indicators. In indicator four, which is applying the concept or problem solving algorithm, all curiosity categories can be mastered well. This is consistent with research conducted by Aningsih and Asih (2017) which states that the curiosity category group has not been able to master the concept of understanding indicators due to several factors. Factors that cause a significant difference between the understanding of the control group concept and the understanding of the experimental group concept are student errors which include language interpretation errors, procedural errors and technical errors (Hidayat and Iksan, 2015).

It can be concluded that students with curiosity in the high category are still superior in their average scores compared to other categories. Curiosity affects the ability to understand concepts in students, as evidenced by students who have high curiosity still superior to the average grade. This is in line with Wicaksana, Wardono & Ridlo (2017) who concluded that the students' mathematical literacy ability in project-based learning with good quality Schoology, the effect of curiosity became one of the factors supporting the success of students' mathematical

literacy abilities. Scaffolding assistance is also one of the factors supporting communication skills and students' curiosity in the Project Based Learning Model (Paruntu, Sukestyarno & Prasetyo, 2018). The effect of the Missouri Mathematics Project Model on students' mathematical understanding ability is supported by research conducted by Rezeki, Setyawan & Amelia (2018) which states that there is a significant influence on the Missouri Mathematics Project Model on the mathematical understanding ability of 7th grade junior high school students in Pekanbaru.

CONCLUSION

Based on the analysis and discussion, the description of understanding concepts in various categories of curiosity shows an increase. This means that the Missouri Mathematics Project learning model with the Scaffolding approach becomes one of the supporting factors in increasing the understanding of concepts.

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